STRUKTURWANDEL
DES EIGENTUMS

Challenges for Re-Embedding Intellectual Property Rights on Genetic Resources

Reflections on access and benefit-sharing in Brazil

Anne Tittor, Eduardo Relly,
Leoni Schlender, and Maria Backhouse

Working Paper No. 10
Oktober 2025

Impressum

Zitierung: Anne Tittor, Eduardo Relly, Leoni Schlender, Maria Backhouse (2025): Challenges for Re-embedding Intellectual Property Rights on Genetic Resources: Reflections on access and benefit-sharing in Brazil, Working Paper 10, Sonderforschungsbereich/Transregio 294 »Strukturwandel des Eigentums«.

Redaktion: Simon Gurisch, Jana Ilnicka, Philipp Köncke, Christine Schickert, Amelie Stuart
Lektorat: Christopher Reid, Mona Gehrke
Satz und Layout: Lilith Poßner

Reihengestaltung: Uwe Adler, Weimar

Herausgeber: Sonderforschungsbereich/ Transregio 294 »Strukturwandel des Eigentums« Friedrich-Schiller-Universität Jena, JenTower, 23. OG, Leutragraben 1, 07743 Jena

www.sfb294-eigentum.de

Challenges for Re-embedding Intellectual Property Rights on Genetic Resources: Reflections on access and benefit-sharing in Brazil[1]

By Anne Tittor, Eduardo Relly, Leoni Schlender, and Maria Backhouse

Abstract

Indigenous peoples and local communities around the world have developed complex knowledge systems with nature that are valuable to many global industries. In 2010, the Nagoya Protocol was adopted as the central mechanism for Access and Benefit Sharing (ABS). The ABS mechanism aims to ensure that so-called traditional (local) knowledge holders receive a share of the benefits generated by commercial appropriation. In this working paper, we draw on the work of Karl Polanyi and insights from the sociology of property to explore the potential of ABS for the social re-embedding and social regulation of intellectual property rights and traditional knowledge. Against this background, we examine the extent to which such re-embedding of this form of property has been successful and argue that we are currently witnessing an "amputated" re-embedding of private intellectual property. We illustrate our thesis with a qualitative study that examines the social negotiations surrounding the implementation of the ABS mechanism in Brazil. We focus on the strategy propagated by many state, private, and civil society actors to catalogue the knowledge of Indigenous peoples and local communities (IPLCs) through so-called "biocultural protocols," with the aim of making this knowledge more visible and protecting it from biopiracy. In the last part of the paper, we reflect on whether we can currently identify a structural change of property in the area of genetic resources, and how digitalization complicates the social re-embedding of property.

Keywords: Intellectual Property, Biodiversity, Access and Benefit Sharing, Brazil, Polanyi, Re-embedding

[1] We would like to thank Irina Herb and Sebastian Sevignani from the SFB Structural Change of Property for their valuable comments on the draft of this working paper.

1. Introduction: The Demand for Benefit-Sharing in Intellectual Property

At the end of the 20th century, biotechnological innovations generated huge profits for the life sciences industry. In the early 1970s, molecular biologists and biochemists in the United States developed technologies to recombine DNA ("recombinant DNA"), opening up a new frontier of genetic engineering and profit. One of the consequences was a new global impetus for drug discovery. Combined with the introduction of intellectual property rights, this led to an extension of private property into previously unimaginable areas such as seeds, (plant) gene sequences, and micro-organisms (Rasmussen 2014: 72). This has led to an increase in property-based relations between people, organizations, and objects worldwide, a process also known as propertization (Siegrist 2017: 20). Increasing propertization trends have triggered protests and counter-movements calling for social limits to private property (ibid.). Impressive examples include Pat Mooney's early book Seeds of the Earth: a private or public resource? (1983) and the protests against "biopiracy" in various countries since the 1990s. Activists and countries from the Global South used the term to encourage people to condemn the appropriation, propertization and commodification of plants, seeds and organisms by transnational pharmaceutical, seed or cosmetic industries. Criticism focused on the fact that, after centuries of resource extraction in countries of the Global South, the local knowledge of smallholders and IPLCs (Indigenous peoples and local communities)[2] about active ingredients or traditional seeds and crops was now being expropriated through private contracts or patenting (Kloppenburg 2004; RAFI and HSCA 1998; Robinson 2010; Shiva 2004). One prominent dispute, for example, was the patenting by a US company of a biopesticide based on the neem tree, which has been used in India for thousands of years as a remedy and biopesticide (Shiva 2004: 69-70). In the late 1990s, several accusations of biopiracy were made in Latin American countries such as Costa Rica (the Merck/INBIO case), Mexico (the ICBG Maya project) and Brazil (the Bioamazônia/Novartis agreement), bringing the issue of biopiracy into the global spotlight (Ribeiro 2002; Delgado-Ramos 2002; Relly 2023).

In an attempt to regulate the inequalities surrounding the appropriation of Indigenous knowledge on biodiversity, and following lengthy negotiations within the framework of the Convention on Biological Diversity (CBD), the Nagoya Protocol was adopted in 2010, establishing a global Access and Benefit-Sharing (ABS) mechanism which came into force

[2] Indigenous peoples are internationally recognized as groups that lived together in a certain territory before colonial invasion or the formation of the nation-state. They have retained their social, cultural, and political characteristics and have an identity that is distinct from the dominant societies they live in (https://terradedireitos.org.br/uploads/arquivos/Carta-web-COP15-Portugues.pdf). Traditional communities are groups that are connected to their territory through cultural, specific agricultural, or forestry practices and that sometimes only emerged after colonization and/or state formation and foreign rule. In Brazil, this includes groups such as Quilombos, which can be traced back to resistant, enslaved people, or collective cultures whose specific territorial rights are also legally recognized (see Almeida 2010). In the context of Nagoya negotiations, these groups are usually categorized together as IPLCs (Indigenous peoples and local communities).

in 2014. This framework, which is binding under international law, aims to enable fair economic and technological benefit-sharing between biodiversity-rich countries of the Global South with large stocks of genetic resources ("megadiverse countries") and countries of the Global North, where these genetic resources are mainly researched and used. A key change was that biodiversity no longer "belonged" to humanity as a common (the so-called common heritage of mankind), but to the country in which it naturally occurred. Access rights and possible compensation payments are now determined by nation-states and negotiated on a bi-national basis. For the first time in international law, the ABS mechanism explicitly recognizes the link between traditional knowledge and associated genetic resources of IPLCs as worthy of protection. IPLCs should also receive compensation from companies that profit from their knowledge. The Nagoya Protocol is therefore an attempt to regulate the intellectual property rights (IPRs) of IPLCs – given that traditional knowledge has been equated with IPRs – by extending them. This equation is one of the key problems: A problem arising from the private property regime was "solved" with more property (Braun 2024: 139-140). Indigenous peoples and local communities are to be compensated for the appropriation and commodification of their knowledge by companies. Their knowledge is interpreted and integrated into the private but *sui generis*[3] property system as "original" knowledge holders (e.g. on plant properties) or "inventors" (e.g. of herbal remedies). Profits from pharmaceutical, cosmetic or other biotechnological innovations should be shared. This is the case, for instance, to the worldwide debated example of the plant Stevia (*Stevia reboudiana Bertoni*), which originated in Paraguay and Brazil. Paraguay did not sign the Nagoya Protocol in order to protect the agribusiness elite and its massive use of foreign genetic resources such as cattle breeds and soybeans. The Guarani people on Paraguayan territory, bearers of the knowledge of stevia's sweetening properties, are therefore not entitled to any benefits, and stevia has been marketed worldwide (Liaudat 2021). While its indigenous history was neglected in the early years, it has recently become a selling point: in Paraguay, an ice cream called Ka'a he'ê (the indigenous name for stevia in Paraguay) is sold, featuring a Guaraní (one of the indigenous groups fighting for recognition of their traditional knowledge of the plant).

In the context of biotechnological innovation, the regulation of intellectual property rights provided for by the Nagoya Protocol has recently been further complexified by the proliferation of "digital sequence information" (DSI). This is the process of digitally mapping the genetic information of organisms, thereby facilitating both access to and sharing of this information. This has become a conventional practice in contemporary science, arguing for a new age of digital (and widespread) biopiracy (Bond and Scott 2020).

[3] "Sui generis law means of its own kind, that is, it is a unique law complete unto itself and often created when current and existing laws are inadequate" (cf. Anderson 2010: 34).

In stark contrast to previous ABS practices, DSI enables access to genetic resources and traditional knowledge without, for example, physical access to a plant; a digitized copy of a genetic structure is sufficient for a user (a scientist or a company) to develop biotechnology, often bypassing the ABS procedures regulated by the Nagoya Protocol (for a more detailed explanation of DSI, see Relly et al. 2024).

The aim of our working paper is twofold: On the one hand, we seek to empirically understand the negotiations on the regulation of intellectual property as reflected in the negotiation and implementation of the Nagoya Protocol relations. On the other hand, we want to contribute conceptually to the Polanyi-inspired debate on the re-embedding of property from our specific perspective on the process of Nagoya implementation in Brazil.

As we are going to explain in more detail in the next section (chapter 2), we understand the ABS mechanism, following Karl Polanyi's "double movement" approach, as a terrain of negotiation. These negotiations take place between market forces, the state, and social movements for the social regulation of private property in the field of intellectual property rights at the local, national, and international levels. Against this background, this working paper explores how private property is re-embedded in the social and cultural contexts of local knowledge holders. As we will argue throughout the paper, this is an "amputated" re-embedding, as (reformist) attempts to regulate intellectual property relations take place within the confines of private property, making alternative forms of ownership less likely. As we will also show in chapter 2, efforts at re-embedding are further complicated by the technological developments of digitization.

In chapter 3, we apply our perspective on the re-embedding of property to the current state of research and debate at the international level and explain the decisions taken so far to regulate DSI. Chapter 4 examines the debate on the implementation of Nagoya in Brazil. The latter is a particularly suitable qualitative case study because, as a megadiverse country, it is strongly committed to the implementation of the Nagoya Protocol at the international and national levels within the framework of the Convention on Biological Diversity and is internationally recognized as a pioneer in this field. Since 2001, the country has been regulating its genetic heritage, which has been protected by the Constitution since 1988 (Brazilian Constitution of 1988, para. 225, II). Since 2015/16, Brazil has been developing national legislation (known as the *Lei da Biodiversidade)* in line with the Nagoya Protocol and has created an institutional framework for its implementation. Chapter 5 then focuses more specifically on the perspectives of state, research, civil society, and private sector actors on the functioning and significance of the Biocultural Protocols. This mechanism is anchored in the Nagoya Protocol (Art. 12, Nagoya Protocol) and in Brazilian legislation (Art. 2, VII, *Lei da Biodiversidade*) and is intended to document

and safeguard the knowledge of IPLCs. Finally, we reflect on our findings in the light of the key questions of the Collaborative Research Centre (SFB) 294 "Structural Change of Property" and discuss the extent to which we observe a structural change of property in the field of genetic resources and their digitalization.

2. Sociological reflections on the contested nature of private (intellectual) property

A central thesis of the Collaborative Research Centre (SFB) 294 on the structural change of property is that the importance of property has increased significantly since the end of state socialism, the expansion of capitalism to India and China, and neoliberal reforms and privatization in Western countries. However, these trends towards propertization and commodification are not linear, as they have also strengthened counter-movements in the Polanyian sense (see below). On the one hand, there are social movements that resist the propertization of the world and advocate the "re-embedding of property" in the form of state regulation or the elaboration of social property (van Dyk and Kip 2023). These counter-movements, on the other hand, are confronted with trends such as increasing digitalization, advocacy of open science, and new information technologies that deviate from the IPR framework (Reitz et al. 2023). Inspired by the SFB debates on these issues, we discuss in the following how these considerations can be "imported" into the field of intellectual property rights on biodiversity regulated by the Nagoya Protocol. We begin by explaining our perspective on propertization (2.1.), continue with an attempt to differentiate the Polanyi-inspired concept of re-embedding property (2.2.), and finally discuss how digitalization in our field complicates efforts to re-embed property (2.3.).

2.1. Propertization in the context of the so-called primitive accumulation

We support the sociological diagnosis that modern societies increasingly regulate the handling of (im-)material objects in terms of property (Siegrist 2006). In the liberal tradition, propertization is seen as unproblematic. Locke's concept of private property, for example, assumes that where natural resources or land do not yet belong to anyone, they can be appropriated without asking anyone's permission. This is based on the assumption of *terra nullis*, which served as a central concept for legitimizing colonialism.[4] On the other hand, various theorists argue that to establish private property is to take something away from someone or, in other words, to exclude someone from that property (see Hume 1978 [1739]; Rousseau 1968 [1762]; Proudhon 2018 [1840] in Peters et al. 2024: 2).

[4] However (and Locke was aware of this), this unsettled, ownerless land did not exist in America or elsewhere; the fiction of terra nullis obscures the actual colonial violence that was necessary to appropriate these territories and resources (Hein et al. 2006: 7).

The expansion of intellectual property rights in the fields of biodiversity, plant breeding and life sciences is part of a propertization trend with complex and contradictory effects and its own limits (Braun 2024). The previous example of stevia illustrates what propertization can mean: in the 2000s, food authorities in the US and the European Union approved the use of glycosides from stevia - a prerequisite that was followed by a significant increase in innovation and product sales, accompanied by a growing demand for product patents (Liaudat 2021: 246, 251).[5]

From our point of view, however, it is important to note that the propertization of biodiversity is by no means a recent process; rather, it has been taking place since the emergence of capitalism and the conquest of the Americas (Moore 2003; Wallerstein 1979). Propertization is further an important dimension of the processes of commodification,[6] which we understand, following Elmar Altvater and Birgit Mahnkopf (1996: 131) as well as Christoph Görg (2004: 1503), as an expression of "so-called primitive accumulation." In this context, Marx (1979) speaks of so-called primitive accumulation to ironically distance himself from the assumption of classical economics that capitalism arose through the accumulation of stock by businessmen. Instead, a specific, namely capitalist, social relationship was established through the violent separation of producers from their means of production. The enclosure of the commons (as collective forms of property) creates what he calls the "doubly" free wage laborer, who is on the one hand freed from serfdom, but on the other hand dependent on wage labor without his means of production (ibid.). As dependency theorists and feminists have added, not only did free wage labor emerge in this process, but it was also intertwined with slavery and housewife labor (see, for example, Frank 1998; Bennholdt-Thomsen et al. 1992). It is important for our argument that the above-mentioned primitive accumulation is not a one-time event in the formation of capitalism, but rather an inherent mechanism whose form can vary over time (Görg 2004: 1503). Thus, the term commodification is used to conceptualize how natural resources are turned into commodities in the sense of a continued primitive accumulation (cf. Altvater and Mahnkopf 1996; Görg 2004). It is a multi-layered process in which resources are "first defined or constituted as such, identified and extracted, and finally integrated into the world market" (Görg 2004: 1503, own translation). Any commodification is thus accompanied by the detachment or disembedding of a resource from its environment (Altvater and Mahnkopf 1996: 130). The definition of private

[5] It was 2008 when the U.S. Food and Drug Administration (FDA) approved the use of steviol glycosides followed shortly after by the European Food Safety Authority. This led to a 5,000% surge in global sales of stevia-based products between 2007 and 2018, along with approximately 4,500 patent applications filed and 1,751 approved related to stevia-based products between 2008 and 2016. Industry analysts such as Research and Markets project that global sales of stevia-based products could reach $700 million by 2025 (Liaudat 2021: 246, 251).

[6] The authors quoted distinguish in German between "valorisation" (German: "Inwertsetzung") and "commodification" (German: "Kommodifizierung"). Since the terms are used synonymously in English, we use "commodification."

property rights by nation-states and international institutions is an important prerequisite for the definition, isolation, extraction, monetization, and eventual trading of the resource in question (cf. Altvater and Mahnkopf 1996: 130-1). Property rights are therefore an important method of commodification, of "separating" actors from their means of production.[7] The decisive factor is that the entire process of commodification – even at the level of defining (private) property rights – is socially contested, as the global protests against biopiracy impressively demonstrate. It is a process of political negotiation about initial or new forms of separation, the outcome of which remains uncertain and depends on the power relations between the social forces involved. The state plays a central role, as it defines and enforces property rights (ibid: 130), while at the same time serving as an arena for these negotiation processes (cf. Brand and Görg 2003). The Nagoya Protocol aims to enable benefit sharing after a successful commodification process. It is thus an attempt to regulate the negative effects of the commodification of genetic resources or information by obliging intellectual property owners to share the benefits with local communities. In this specific context, intellectual property rights thus impose an obligation to share profits, even though the form of private property remains untouched.

2.2. A Polanyi-inspired understanding of different forms of re-embedding

We draw on Polanyi's concept of the "double movement" (1977) to better understand these processes of negotiation around the regulation of intellectual property rights. In doing so, we develop his analyses of social negotiations and conflicts over commodification processes (cf. Angelis 2001: 13). Using the term "double movement," Polanyi conceptualizes capitalism as a movement between the "disembedded" market with its specific property relations and the social counter-movements that attempt to re-embed it, grounding his argument in historical considerations. During industrialization and the spread of capitalism in the nineteenth century, markets became increasingly detached from social, cultural and political institutions, with dramatic social and political consequences. At the same time, this process gave rise to social counter-movements that sought to regulate this process. These movements therefore sought to re-embed the market in society by introducing regulations and social protection from its harsh elements.

[7] As Ralph Kloppenburg impressively shows, technological innovations such as hybrid seeds and genetic engineering, in combination with the creation of intellectual property rights, have made it possible to extend this separation not only to the soil but also to farmers' knowledge production such as seeds (Kloppenburg 2004). According to Kloppenburg, it was only with the establishment and enforcement of intellectual property rights that farmers lost control over the seeds they had been breeding and exchanging since centuries to large agricultural companies.

Although the distinction between embedded and disembedded markets is key to Polanyi's central concepts (Fraser 2013: 143), he did not properly define the notion of re-embedding. Some authors distinguish between a "soft" or reformist reading and a hard reading, which argues for fundamental social change (Goodwin 2018: 9). The soft reading tends to see embeddedness as a matter of degree, often interpreting the history of capitalism as characterized by cycles of disembedding and re-embedding (ibid). In contrast, a hard reading tends to conceptualize embeddedness in absolute terms, denying the possibility of re-embedding under contemporary capitalism and pointing to the general contradictions of capitalism. We do not follow this strictly dualist conception of re-embedding, as we assume complex hybrid forms that we want to typologize more precisely. As Fraser points out, there is a tendency in Polanyi to judge embedded markets as good and marketization and disembedded markets as bad, acknowledging that markets are never completely disembedded, but the degree and form of embeddedness vary (Fraser 2011: 141). Accordingly, we seek to explore the contradictory nature (of the regulation) of property rights. Private property rights are "undoubtedly a central element of modern capitalist societies," but "property rights in *general*" have a much broader meaning (Hein et al. 2006: 7, emphasis in original, own translation) and refer to both pre-capitalist relations of domination and collective forms of property. The latter can take the form of cooperatives, for example, which may or may not be integrated into capitalism (ibid.). Access and benefit-sharing mechanisms should hence not be hastily dismissed as the mere enforcement of private property (Meyer and Naicker, 2023). Instead, we want to examine the struggle for their social re-embedding in Brazil, based on the Nagoya Protocol, a process in which local, national, and international negotiations interact. In the Polanyian sense, from the international level of environmental conventions and free trade agreements to bilateral agreements between countries and contracts between companies and IPLCs, different social forces are struggling for the radicalization and delimitation of intellectual property on the one hand, and for its limitation or re-embedding on the other. In the latter case, it is mainly a question of strengthening the demands of IPLCs for the recognition of their knowledge and for the guarantee of their share in the profits generated by the biotechnology industries (cosmetics, pharmaceuticals, and seeds).

Therefore, in this study we examine the extent to which the implementation of the ABS mechanism in Brazil is an expression of "reformist re-embedding," "amputated reformist re-embedding" or "transformative re-embedding." The term "failed re-embedding" means that there are no regulatory policies in place and that the commodification of genetic resources and the expansion of private property rights continue. The term "reformist re-embedding" describes that the liberal goals of the ABS mechanism are achieved and, for

example, IPLCs benefit from the profits of the pharmaceutical or cosmetics industries. The term "amputated reformist re-embedding" implies that the objectives of the ABS mechanism are only partially achieved.[8] Finally, in line with Nancy Fraser (2013), we define "transformative re-embedding" as a radical change beyond the capitalist market logic and its mere regulation.

Table 1: Conceptualizing different forms of re-embedding of intellectual property rights

	Failed re-embedding	Amputated re-embedding	Reformist re-embedding	Potential elements of a transformative re-embedding
General idea	Forces struggling for the re-embedding of property without archiving any regulations	Forces struggling for the re-embedding of property without achieving effective regulations	Forces struggling for the re-embedding of property archiving to limit further propertization and redistribute benefits	Beyond private property; effective limits to propertization; restitution for propertization in the past; economy (and property) is embedded into society

Table 1. Source: authors' elaborations, based on Polanyi and Fraser

As Table 1 already anticipates, we argue in this paper that even full compliance with the promises made to the IPLCs in the Nagoya process will, at best, lead to a reformist re-embedding. However, the status quo represents an amputated re-embedding, with several promises yet to be fulfilled (see below). It is also possible to imagine certain potential elements of a transformative re-embedding (but as transformation is a dynamic process, many more are likely to emerge), but the current correlation of social forces does not make this a likely option. At the same time, we argue that struggles for re-embedding have ambivalent effects because they contribute to extending the legitimacy of private property and do not address the historical dimension of colonial/modern appropriation of Indigenous knowledge and territories.

2.3. Digitalization as an additional driver of change

Alongside the social debates on the disembedding and re-embedding of property, a technological and informational change is taking place, which in turn can be understood

[8] This concept originates from a lecture given by Silke van Dyk called "Post-Neoliberalism? Polanyi's double movement the 'amputated' re-embedding of the liberal economy", digital colloquium of the Collaborative Research Center "Structural Change of Property", 26.1.2024. The concepts summarize findings of different sub-projects that describe contradictory attempts to re-embed private property.

as an independent driver of the structural change of property (Rosa 2023: 26).[9] The movement to replace the material basis of genetic resources with informational goods, driven by DSI, is specific to information capitalism (Cohen 2017) and can be further captured by Polanyi's concept of double movement, when applied to ”digital transformation” (Mulatinho Simoes and Birchfield 2024). Polanyi argued in The Great Transformation – also through a critical examination of the national economy – that land, labor, and money are “fictitious commodities.” That is, they are treated as commodities produced for sale on the market rather than as crucial elements on which our social world is based. Several researchers have applied this argument to biodiversity, which is treated as a fictitious commodity both in biotechnology research and in current attempts to conserve it (McAfee 1999; Tordjman and Boisvert 2012).

In biotechnology research, DSI facilitates the exchange of digital information about the molecular composition of genetic resources, making it cheap, easy, and fast – without the need to access physical material. This information is therefore dematerialized (Laird et al. 2020), and access to genetic resources no longer depends on scientific collections or travelling to where the material is growing (in situ). Instead, it is often shared via online databases (in silico). At the same time, it is more difficult to trace where, when, how, and by whom the data were collected. Benefit-sharing for countries of the Global South and/or IPLCs is therefore more difficult to organize, as digital files can be easily shared and consent can also be more easily circumvented (Bond and Scott 2020). The shifts in the property order triggered by information capitalism are discussed extensively elsewhere (Cohen 2017; Reitz 2024), with a focus on the renegotiation between open and closed data access. In light of this, it is central to our analysis to consider how these shifts can be socially contained or whether a countermovement can emerge, as Cohen points out:

> Extending the analytical frame and the metaphor of the double movement, it is useful to frame the emergence of informational capitalism in terms of three large-scale shifts that together constitute a movement toward informational capitalism: the propertization (or enclosure) of intangible resources, the dematerialization of the basic factors of industrial production, and the embedding of patterns of barter and exchange within information platforms. Whether the effects of those changes will elicit a meaningful countermovement is yet to be seen (2017: 4).

In addition, there is a tendency for private companies in information capitalism – not only in the pharmaceutical sector – to draw on public research and publicly provided data, which is then used to prepare a new commercial enclosure by applying for a patent (Reitz

[9] For the sake of completeness, other driving forces should also be mentioned, including the strong concentration of property in the private sector accompanied by national debt as well as geopolitical shifts and rivalries (ibid.). Structural change of property is understood as a process in which both property’s structural function and its social significance change, for example in that ownership and possession or use become increasingly divergent.

2024: 95). In doing so, companies are resourceful in identifying regulatory weaknesses that allow them to avoid paying compensation to others.

In more abstract terms, the DSI exacerbates the already existing difficulty of defining the object of property. Not only are the objects of property blurred (from plants and animals to resources and information), but the determination of the subjects of property is also complicated (Braun 2024). The original holders of knowledge find it increasingly difficult to assert their claims or even to consent to granting access to their knowledge contained in genetic resources in the hope of documenting their authorship (see below).

In the remainder of this article, we will first summarize the current state of negotiations on the ABS mechanism and the Nagoya Protocol in Brazil. In the empirical part, we will use an empirical study to trace how different stakeholders assess and discuss the re-embedding of intellectual property rights in Brazil. The study is based on more than 80 expert interviews (Meuser and Nagel 2016), which were conducted between 2021 and 2023. Some of the key actors involved in the implementation process were interviewed, including lawyers and consultants who participated in ABS negotiations, academics conducting research on the subject, and various representatives (including Indigenous representatives) involved in the negotiation and implementation of the Nagoya Protocol and related legislation in Brazil. Furthermore, participatory observation was conducted at the COP15 in Montreal in December 2022, examining the specific issues and processes of the negotiations, with a particular focus on what was presented as best practice and how DSI was addressed. In addition, we analyzed a large number of documents from international organizations and stakeholders on the negotiation process and its contentious issues, in particular protocols and legal opinions, as well as Brazilian regulations, laws, sectoral reports (industry, NGOs), and biocultural protocols (see explanation below). The material was analyzed based on Mayring's content analysis (Mayring and Fenzl 2019). The interviews (recorded and fully transcribed) and other documents were coded using MAXQDA software.

3. Global negotiations on the extension and social regulation of intellectual property in the context of the ABS mechanism

The Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement, adopted by the WTO in 1995, is of great importance for the global extension of private property, especially intellectual property. Article 27.3(b)[10] of the agreement allows patents on so-

[10] This article was reviewed in the context of the Doha Declaration (2001), which stated the need to implement this disposition in light of the Convention on Biological Diversity and the binding protections ascribed to Traditional knowledge and folklore.

called “genetic resources,” which legally secures the commodification of microorganisms, seeds, or medicinal plants on the grounds that their genetic structures could be an elementary part of a new product or that companies could alienate their research on these genetic structures.

The prerequisite for patenting is defined as the addition of human labor or innovation. This institutionalizes Locke's idea that property rights arise from the appropriation of natural resources and the addition of one's own labor and industriousness (without having to ask permission beforehand) on an international level (see Hein et al. 2006).

Those – often IPLCs – who had bred the plants and identified their active ingredients, sometimes over centuries, were left empty-handed by the property system established by the TRIPS Agreement, which was based on the generalization of patents, usually claimed by either scientists or corporations from the Global North (Dutfield 2020). As noted above, environmental and human rights activists worldwide criticized this strategy of propertization, accusing it of “biopiracy” (Shiva 2004; Mooney 2000).

This globally articulated criticism ultimately led to the adoption of the Nagoya Protocol as part of the UN Convention on Biological Diversity in 2010. The Nagoya Protocol can be seen as a counterweight to the TRIPS Agreement (Karayanidi 2011) and represents a compromise between three interest groups (Just et al. 2010: 48): first, global biotech companies and the scientific community (represented mainly by countries of the Global North) seeking legal access to biodiversity; second, countries of the Global South seeking sovereignty over their biological resources and expecting economic benefits; and third, social movements against biopiracy advocating the strengthening of IPLCs’ property rights, which increased pressure on the negotiations. In this respect, we can identify multi-layered counter-movements, composed on the one hand of biodiversity-rich countries that seek to re-embed intellectual property within the nation-state through regulation and by limiting uncontrolled access, and on the other hand of social movements that seek to re-embed traditional knowledge within the social and cultural conditions of local knowledge holders.

In our view, the Nagoya Protocol can be interpreted as an attempt to re-embed intellectual property, as it is the first (and so far, only) binding international agreement that recognizes the importance of IPLC knowledge. Together with the Convention concerning Indigenous and Tribal Peoples in Independent Countries (1989) (ILO 169) and the UN Declaration on the Rights of Indigenous Peoples (2007), it forms an international legal framework for the protection of Indigenous rights. The Protocol aims to share the benefits of the biotechnology industry with IPLCs, but only loosely defines a redistribution mechanism through either consent or biocultural protocols. This mechanism is intended to allow for

monetary and non-monetary redistribution (projects, grants, technology transfer, etc.), thus indirectly contributing to the financing of biodiversity conservation.

Nevertheless, despite the commendable recognition of IPLC knowledge (Suiseeya 2014), its non-binding nature and limited implementation make it an "amputated" form of re-embedding. Accordingly, the Nagoya Protocol has been criticized by various actors since its inception, mainly because of its aim to regulate and extend intellectual property. There are several points of criticism of the Nagoya Protocol which are based on different levels of analysis. Nevertheless, taken together, the following main points of criticism contribute to an empirical understanding of "amputated" re-embedding:

- The Nagoya Protocol only applies from the year of its ratification. It does not address the theft of biomaterials and knowledge from IPLCs throughout history, particularly in the context of the emergence of intellectual property rights in the 20th century. In addition, no significant payments were made to IPLCs worldwide until spring 2024, which Klünker (2024) describes in Hardian terms as an elementary feature of the "tragedy of access-and-benefit-sharing."
- In the absence of sanction mechanisms, biodiversity-rich countries have little ability to enforce their claims at the global level (Rabitz 2015; Muller 2018).
- It is sometimes impossible to identify the subject of property (see above) for compensation payments because the knowledge of a medicinal plant or other resources can rarely be attributed exclusively to *one* Traditional community or its occurrence to *one* nation-state (Dutfield 2015; Muller 2018). In addition, traditional knowledge cannot be clearly distinguished from national biological heritage, and conflicts of interest may arise between IPLC and the respective nation-states regarding compensation payments or the development of genetic resources. The interests of the respective states are not necessarily congruent with those of IPLC (Dutfield 2015). The nation-state is therefore not a neutral mediator between the interests of IPLCs and transnational corporations.
- The Nagoya Protocol obliges national governments to at least "take into account" IPLC knowledge of medicinal plants when making compensation payments – although taking into account does not necessarily mean respecting or regulating this knowledge in favor of IPLCs, as countries can provide resources without restriction (Robinson and Forsyth 2016: 324). This means that while the Protocol requires member states to establish and respect national ABS regimes, it still leaves states the option of not regulating access and allowing the use of biological resources and associated knowledge without the consent of IPLCs (Fredriksson 2018: 178).
- The Nagoya Protocol's fixation on regulating IPRs in terms of private property leads to a problematic narrowing of IPLC knowledge, which is, however, intertwined with context-

specific territorial rights, rules, and customary rights, practices and cultures (Dutfield 2015). The dominant private property regime is explicitly affirmed, with local property regimes subordinated to it. New conflict dynamics can arise, for example, over complex traditional access and customary rights, such as land access rights, gathering, hunting or fishing rights, in which traditional knowledge is embedded (Robinson and Forsyth 2016: 328).

- The Nagoya Protocol confirms a Western view of nature by erasing cultural and spiritual values that are central to IPLCs worldwide (Posey 1999).
- The Nagoya Protocol is based on the liberal fiction of a contract in which members of IPLCs (as individuals) give their consent – or more precisely "prior and informed consent," as defined in the Protocol – to the use of resources. This form of contract and consent is largely at odds with the decision-making processes of IPLCs and can lead to conflict, exclusion, and resentment (see below). As a result, the introduction of intellectual property threatens the very cultures it seeks to protect (ibid.)
- A comprehensive transformation of the understanding of intellectual property rights was never really debated in the Nagoya negotiations. Instead, the Protocol reinforced the notion of knowledge as someone's private property that can be used for commodification and neglected the link between Indigenous intellectual property rights and human rights.

Another issue that has long caused uncertainty is Digital Sequence Information (DSI). DSI means that large seed and pharmaceutical companies are no longer dependent on physical and in situ bioprospecting, and ethnobotanical research and can easily circumvent the Protocol and consent by accessing databases and genome banks (for a more detailed explanation of DSI see Relly et al. 2024). For a long time, the Nagoya Protocol and the Convention on Biological Diversity lacked clear guidelines on access, use, and exchange of DSI, which has led to heated debates between countries of the Global South and North on the current and future propertization, appropriation, and benefit-sharing of genetic resources (Muller 2018; own participant observation in Montreal 2022). These technological developments have been on the horizon for years but were largely ignored in previous negotiations (Bond and Scott 2020). In December 2022, the Montreal COP adopted Decision 15/9,[11] which changed this.[12] Since then, the use of DSI has been subject to benefit-sharing, closing an important gap between material genetic resources

[11] For further consideration, see Chapter 5. Decision 15/9 is available at: https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-09-en.pdf

[12] A positive feature of all these discussions, albeit one that was barely discussed in Brazil, is the recognition of the FAIR and CARE principles for Indigenous data sovereignty in Decision 9/15 (COP15). Initiatives such as the Biocultural Labels ('BC Labels'), presented by representatives of Indigenous peoples in December 2022, also reflect their digital sovereignty over traditional knowledge in the context of DSI. The labels allow IPLCs to claim provenance, origin, and even property of data stored in digital repositories. There is a clear tendency for biocultural protocols (see below) to reflect the new reality of DSI (Carrol et al. 2021).

(in the sense of biological samples, ex-situ, and in-situ access) and genetic resources in the form of digital information. Still, paragraph 4 of the Decision states that "the dissemination of digital sequence information on genetic resources and specific practices in their utilization requires a specific solution for benefit-sharing." This "special solution" has long been pending, but it was assumed that a multilateral system would now either replace ABS in the Nagoya Protocol or coexist with it (a hybrid solution, which is less likely) (van Vooren and Gevrenova 2024). The long inconclusive outcome regarding the regulation of DSI under the Nagoya Protocol has led some observers to question the entire proprietary construct on which the Convention on Biological Diversity and the Protocol are based (Mulatinho Simoes and Birchfield 2024: 55).

At COP16 in Cali, Colombia (2024), the parties of the CBD agreed on a modest solution to increase private sector involvement in the DSI issue. The recent agreement states that companies will be encouraged to voluntarily pay for DSI through the Cali Fund. Companies that meet two of three criteria – $20 million in annual assets, $50 million in annual sales, or $5 million in annual profits averaged over the previous three years (Taylor 2024) – will contribute either 1 percent of their profits or 0.1 percent of their sales to the Cali Fund. In addition, DSI users will share non-monetary benefits with the ABS Clearing House managed by the Secretariat of the Convention on Biological Diversity. Many other aspects are to be discussed in the near future, such as the level of availability of digital sequence information, additional modalities for benefit-sharing related to the use of DSI on genetic resources, obligations of entities operating databases containing digital sequences, etc. (Marinello 2024). In addition, at least half of the resources of the Cali Fund will be reserved for the needs of Indigenous peoples, including the promotion of gender-sensitive approaches. Indigenous communities and local populations are explicitly mentioned as defenders of nature, and the role of people of African descent is recognized (Zelli 2024). A steering committee made up of representatives from various sectors, including civil society, academia, and Indigenous groups, will oversee the implementation of the multilateral mechanism (Bompan 2024). This was hailed as a victory for Indigenous groups in Cali. That said, the Cali Fund was only created for large companies and is voluntary. Again, the promised access and benefit-sharing is only for 1 percent of profits, and it will take time for the benefits to trickle down to IPLCs (if they ever do). Only time will tell how successful the mechanism will be.

For more than 20 years, the ABS concept has been continuously negotiated within and between countries, with many states actively working to implement it in national legislation. Brazil is an interesting case in this respect, partly because it has decided to classify genetic resources as "heritage" (which includes both material and information) rather than just "material," as reflected in its 1988 Federal Constitution. In fact, the

"heritage" approach was implemented as early as 2001 and is still part of the current Biodiversity Law[13] that governs these issues today. When DSI was negotiated as a global issue within the framework of the biodiversity conventions agreed at COP13 (2016) and in force since then, Brazil was able to claim that its existing regulation already included DSI, positioning Brazil as a role model (Da Silva et al. 2021). Thus, despite ongoing global discussions on the implications of DSI for the ABS architecture created by the Nagoya Protocol, Brazil's dispositions on ABS as heritage link, for example, the materiality of a plant with its informational genetic structure. This conceptual view of genetic resources, combined with the fact that Brazil is the most biodiverse nation on the planet and is home to a very active Indigenous movement, offers empirical, theoretical, and global insights into the capacity for (amputated) re-embedding of intellectual property rights over genetic resources and traditional knowledge.

4. The implementation of ABS in Brazil: The role of national legislation and the cosmetics industry

The ABS mechanism in Brazil is implemented within the legal framework of the 2015 National Biodiversity Act. This law is formulated "in the spirit of Nagoya" (Golan et al. 2022) but brings its own emphasis to the Brazilian debate on fair benefit-sharing. It is therefore more influential than the Nagoya Protocol, which Brazil did not ratify until 2021. The Biodiversity Law led to the creation of a specialized body called the Conselho do Patrimônio Genético (CGEN), or Genetic Heritage Council, which was set up as a staff unit within the Ministry of the Environment responsible for implementing ABS. The body operates a digital platform called "SISGEN," where the entire process of access, consent, mutually agreed terms, research and development, registration of products, shipment of samples, and additional measures to protect intellectual property are registered. Access to this platform is only granted to Brazilian researchers and institutions; foreign entities or researchers must sign a partnership agreement with Brazilian institutions. The Council also manages funds whose official purpose is to disburse the State's share of ABS to IPLCs. These funds come from a variety of sources, including the annual budget, donations, fines for the illegal use of genetic resources, and, most importantly, existing ABS contracts. Access and benefit-sharing in Brazil includes monetary and non-monetary modalities, the latter including, for example, conservation and local development projects and research grants.

[13] The *Lei da Biodiversidade* (Law 13.123/2015, LB) and the subsequent National Decree 8.772/2016 establish the legal framework, repealing the previous provisional measure Medida Provisória 2.186-16/2001. The *Lei da Biodiversidade* is thus the law that implements the Nagoya Protocol in Brazil (Decree 11.865/2023).

However, the Brazilian case also reflects what was said in chapter 3 about the situation at the international level: The ABS goal of re-embedding intellectual property through monetary benefit-sharing has not yet been achieved, apart from the formal recognition of the importance of IPLC knowledge. Although some companies are already paying into the Brazilian ABS fund through CGEN, their payment is only one percent of net profits but could be even less depending on sectoral agreements. According to a presentation by CGEN at COP15 in Montreal (2022), around $1,250,000 has been paid into the national ABS fund for the use of genetic resources. Despite this amount (which is actually low, considering that these are deposits made since 2001), no ABS compensation has yet been paid by the government to IPLCs. So far, and according to the same presentation, since 2001 a total of 3,116 users have registered products under the non-monetary ABS modality[14] (e.g. in the form of project funding) and 1,789 users have chosen the monetary ABS modality, with the latter being obliged to pay compensation to IPLCs. However, the vast majority of users or applicants have been able to circumvent this obligation, for example by marketing agricultural products that are legally exempt from ABS payments due to the influential Brazilian agribusiness lobby.[15]

Brazilian legislation requires that developments based on DSI be treated as if they had been created by access to the material. Failure to report the use of the data can result in fines. At the same time, the Brazilian state is seen as inefficient and has been accused of delaying the implementation of state ABS payments.

Contrary to popular beliefs that ABS rules are unsettling for science and industry, Lepsch-Cunha and others (2018) show that Amazonian genetic resource use by foreign scientists and companies has not in fact decreased since ABS legislation was introduced. Rather, digital access through the DSI and the inability of the CGEN to prevent the corresponding *in silico* use have led to the use of genetic resources without ABS payments.

Some ABS payments formally fall outside the scope of the Nagoya Protocol but were frequently mentioned by our interviewees. Some private companies, mainly from the cosmetics industry (such as Natura and L'Oréal), currently make ABS payments to traditional gatherers and collectors' communities, mainly in the Amazon, who provide them with specific plants and seeds (e.g. certain types of palm nuts) for cosmetic production. The relationship between cosmetics industries such as Natura and those providing materials is highly relevant to the companies' marketing strategies to present themselves as ethical and fair – and it has become a central reference point for the

[14] A list of recently concluded non-monetary ABS agreements is available here: https://www.gov.br/mma/pt-br/assuntos/biodiversidade/patrimonio-genetico/reparticao-de-beneficios-1/acordos-de-reparticao-de-beneficios-nao-monetaria/arbs-firmados. Accessed on November 21, 2023.

[15] CGEN does not publish detailed figures on monetary ABS data, citing commercial confidentiality.

practice of ABS in the Brazilian and, in some cases, international debate, as illustrated by the *Projeto Brogotá*[16] (GSS Sustentabilidade e Bioinovação Ltda et al. 2022). This shows that the debate on fair benefit-sharing under the Nagoya Protocol also creates a specific dynamic in the natural products industry and remains relevant even when no intellectual property rights are involved, for example through the patenting of active ingredients.

At the same time, these prominent collaborations in the cosmetics sector have led to another political and legal effect in the implementation of the Nagoya Protocol: the growing dominance of the private sector in the implementation of ABS in Brazil. Natura & Co is presenting itself as a pioneer of ABS in Brazil, for example by setting up its own ABS fund, "Fundo Natura." They developed a draft law in collaboration with scientists and agribusinessmen, which laid the foundation for the *Lei da Biodiversidade* (Teixeira and Da Silva 2018: 206). This approach to the design and implementation of the ABS mechanism has been criticized by various actors. Smallholder movements (such as the *Associação em Áreas* de Assentamento do Maranhão, ASSEMA), Indigenous peoples (such as Almires Martins Machado, leader of the Guarani-Kaiowás), Quilombolas (*Coordenação Nacional de Comunidades Quilombolas*, CONAQ), Traditional communities (such as the *Rede de Comunidades Tradicionais Pantaneira*), and legal scholars have jointly published an anthology (Moreira et al. 2017), calling for the *Lei da Biodiversidade* to be considered a violation of ILO 169.

In the name of Indigenous peoples, but without their participation, the ABS mechanism has thus introduced a highly complex mechanism that requires such a high level of expertise that many Indigenous representatives interviewed during our field research were unwilling or unable to fully participate in the process.

The law has also been strongly criticized by Brazilian scientists. They see it as an obstacle to research in Brazil, putting it at a disadvantage compared to research from the Global North, which can easily circumvent all ABS regulations (Bockman et al. 2018).

Last but not least, the ABS concept and the Nagoya Protocol were designed to manage genetic biodiversity in the form of material genetic/biological exchange, such as plant and animal samples. Genetic sequencing technologies and the widespread development of information sharing in science and research are changing the game of materiality. There is great concern that DSI, which is genetic information stripped of its material bearer, will make it even easier for companies to circumvent ABS altogether and exploit loopholes – as Lepsch-Cunha et al. (2018) pointed out above – to evade existing legislation:

[16] The *Projeto Brogotá* compares ABS regulations worldwide based on the Brazilian *Lei da Biodiversidade*. It is financed by companies such as Natura. The project is causing quite a stir and was presented at a COP15 side event in 2022.

> Now, regarding DSI, I think there is this concern that countries that do not have the biodiversity that Brazil has might find ways to cheat on the benefit-sharing mechanism, all because of this DSI. So, I think it is a topic that tends to be very relevant for us and for these populations. Right now, we are seeing just the tip of the iceberg, but I think this iceberg is large, and if no discussion is held to prevent it from being exploited, it certainly will be. Because capital thrives on this, doesn't it? It will find loopholes in the law and do whatever is necessary to make bigger profits (I15: 37).

Scientific observers complain that Brazil needs to do more to fulfil its role as a pioneer and voice of the Global South in the debate on DSI (biologist and NGO sustainability expert I10; biologist I11), while a former representative of the Ministry of the Environment points to the adequacy of the legal regulation of DSI through the Brazilian Biodiversity Law (I12). On the other hand, an Indigenous representative stresses the danger of DSIs and complains that the lack of regulation of DSIs in the Biodiversity Convention could completely undermine ABS as a mechanism:

> I think that DSI is the end, isn't it? It's the end. It's the end. It puts an end to everything we're doing here in terms of legislation (I8).

Despite the controversial consequences of the DSI, almost all of the experts we interviewed, both from the state and from civil society, clearly support the ABS regulation and the Nagoya Protocol and advocate the implementation of corresponding institutional and legal adjustments. This is because it is "better than nothing" (biologist and environmental activist I1) or "at least breadcrumbs" (scientist I2) and can "alleviate the problem" (Indigenous representative I3). Almost unanimously, representatives of NGOs and IPLC associations hope to improve implementation, raise awareness of ABS, and increase understanding of the legislation (for a more detailed description of the different positions, see Relly 2024). Some interviewees place considerable hope in biocultural protocols, which is why we examine this mechanism in more detail in the following chapter.

5. The "amputated" re-embedding of property through biocultural protocols

When asked about the implementation of ABS, many of our interviewees, especially from Brazilian state and civil society institutions, refer to the mechanism of biocultural or communitarian protocols. These protocols are enshrined in both the Nagoya Protocol (Art. 12) and the Brazilian Biodiversity Law (Art. 2 VII). Biocultural protocols are intended to enable the respective IPLCs to control their genetic resources and to regulate the communal receipt of transfer payments. Biocultural protocols are intended to provide a general description of the community, its territory, its food habits and the plants cultivated for them, its cultural expressions and knowledge (e.g. handicrafts, body art). For many local actors, the legal norm underpinning the re-embedding of traditional

knowledge in the social and cultural contexts of the local knowledge holders seems secondary as long as it is effectively implemented. Therefore, the interviewees do not make a clear distinction between the different ABS procedures. Most statements refer to the Biodiversity Law, which is more important in practice. However, the Protocols are also central to the implementation of ABS under the Nagoya Protocol, as they prepare the ground for subsequent payments or compensation through benefit-sharing.

Most of our interviewees are very positive about biocultural protocols (e.g. Indigenous representatives I4 and I3, cosmetics industry employees I5), mainly because they believe that these protocols could help Indigenous communities to present their traditional knowledge and assert their rights. Biocultural protocols are also described in Brazilian academic literature as a victory for the IPLC's struggle to amend the controversial Biodiversity Law (Andrade 2022; Ido 2018). Interviewee I4, an Indigenous woman from northern Brazil and member of CGEN, explains that these protocols are “our dream […], especially because they [the Brazilian government] have to promote the biocultural protocols and respect the opinion of the people.” Actors who are critical of the design of the ABS mechanism in the Nagoya Protocol and of the Brazilian Biodiversity Law in several other respects are nonetheless positive about the biocultural protocols (see, for example, Association of Civil Society Organizations in Brazil 2022: 9).

Many interviewees expressed the hope that the biocultural protocols could strengthen IPLCs' traditional knowledge, economic practices, forms of organization, and social rights, thereby building bridges with other parts of society:

> The biocultural protocols not only record our relationship to our territory and to our biodiversity, but […] also serve to inform our community about the external processes, such as the [biodiversity] law […] and what they think about the territory that belongs to us (I3).

The biocultural protocols are thus also seen as a means of translating the ways of life and ontologies of the IPLCs for other parts of society, and vice versa. On the one hand, the IPLCs are informed about how the rest of Brazilian society functions; on the other hand, non-IPLC Brazilians come to understand how the IPLCs are organized. Activist-lawyer I6 illustrates this role and how it differs from other documents:

> It is not a contractual protocol, it is not two free parties coming together at a table and concluding a contract, it is not that. The protocol must be a unilateral act on the part of the community indicating how it will respond to outside requests based on its knowledge, culture and perspective (I6).

If these protocols primarily document the way of life and traditional knowledge of IPLCs, they may serve as a basis for more structured ABS negotiations in the future. Even if they do not lead directly to formal agreements, they can represent a re-embedding of

intellectual property by at least curbing the previous system of propertization. In this sense, they clearly mark a shift away from the status quo ante.

Yet, despite their centrality in the discussion, only four biocultural protocols have been published in Brazil as of spring 2025 (Articulação Pacari 2015; Rede GTA and Comite gestor do protocolo comunitário do Bailique 2013; Povo Ashaninka 2016; Reserva Extrativista (Resex) do Riozinho do Anfrísio 2013).[17] According to the 33rd online meeting of the CGEN on 24-25 May, five other biocultural protocols are currently being negotiated[18] but have not yet been published.

The fact that only four protocols have been published to date is due to the complex and costly process and the lack of rules on who should bear the costs. International cooperation[19] organizations and the Brazilian state have therefore played a particularly important role in supporting their production. A second reason is that Brazil's radical right-wing President Jair M. Bolsonaro (2019-2022) has systematically undermined the rights of IPLCs in recent years (see Backhouse 2022).

Another reason may be that biocultural protocols are not the only initiatives and forms of protection of traditional knowledge. Other forms of property should also be mentioned, such as appellations of origin, collective trademarks (Ido and Valentini 2018; Melo and Bezerra 2023), and (copyright-protected) book publications,[20] all of which are used by IPLCs to protect their intellectual property. Despite the extensive search for the most appropriate way to document traditional knowledge, the role of biocultural protocols in relation to genetic resources remains central (Guetta and Bensusan 2018: 125-6).

Only one of the protocols about a territory where gathering activities take place (Reserva Extrativista (Resex) do Riozinho do Anfrísio 2013) includes a more detailed list of plants cultivated (e.g. açaí and mandioca), but these plants are not unique to these areas but are common in the northern region of Brazil. The lack of specificity in the biocultural protocols reflects the desire to create documents that address the history, identity, and land rights of IPLCs – with which their traditional knowledge is inextricably linked – rather than simply

[17] There are 34 biocultural protocols in Latin America (Andrade 2022: 203).

[18] Five more are currently being negotiated in Brazil: Protocolos Comunitários na RESEX Arapixi (bioma Amazônia); Povo Xukuru, região da Boa Vista - PE (bioma Caatinga); Mulheres extrativistas da região do Alto Rio Araguari - PA (bioma Amazônia); Cooperativa Sertão Veredas - MG (bioma Cerrado);e Comunidade Quilombola Cangula - BA (bioma Mata Atlântica).

[19] International organizations such as the United Nations Program for Development (UNPD) have also been involved in the production of biocultural protocols in Brazil (UNDP - Global Environmental Finance 2018: 201). Between 2018 and 2021, the UNPD/Global Environment Facility (GEF) implemented the BRA/18/003 project in collaboration with the Brazilian government, the aim of which was to "formulate and create a Brazil-wide template for biocultural protocols" (p. 27).

[20] Over the last 20 years, IPLCs have published several books documenting specific remedies and plants. Books such as *The Falling Sky* (Kopenawa et al. 2013) and the *Enciclopédia da Floresta - O Alto Juruá: Práticas e Conhecimentos das Populações* (Da Cunha et al. 2002) have published Traditional knowledge that is associated with plant genetic resources. The *Guarani-Kaiowás*, in collaboration with scientists from the *Fundação Oswaldo Cruz* (FIOCRUZ), have now published a comprehensive copyright-protected book (Basta et al. 2020) on *Guarani-Kaiowá* medicinal plants.

cataloguing knowledge. In our view, biocultural protocols are an attempt to communicate the intertwined nature of traditional knowledge and genetic resources. They seek to demonstrate that Indigenous ways of life and the management of the ecosystem by IPLCs have produced these resources in their current form. In a figurative sense, these plants and their associated knowledge are thus recognized and re-embedded in the social and cultural relationships of the local knowledge holders, potentially limiting the process of appropriation. Yet, it is not a complete re-embedding, as contradictions remain.

> What do we identify as an object of associated Traditional knowledge? The communities that pick flowers identify a set of elements for handling them, for protecting them, etc., which are objects of Traditional knowledge that they want to protect. […] It's not about picking the flowers, it's about a set of elements that are in the field that makes up the community's way of being and living […]. So that's what we often see […] – and what we also criticize; because the Biodiversity Law focuses on the object of protection, it restricts what is worth protecting to something that is patentable (I7).

Some actors (e.g., activist-lawyer I7 and lawyer I6) stress (as we did for Nagoya in chapter 3) that the main purpose of the Lei da Biodiversidade is to grant access to genetic resources – even if this access may be limited. The focus here is on an object (such as a plant or the knowledge of its active ingredient), with communities only relevant in so far as they maintain and care for these objects. Consequently, some observers (Dallagnol et al. 2016; Guetta and Bensusan 2018: 135) criticize the Brazilian Biodiversity Law for focusing on access to resources rather than the protection of IPLCs or their knowledge:

> The law [Brazilian Biodiversity Law, authors' note] is not a law to protect knowledge, on the contrary, it is a law of access; it is a law that determines how to access resources and how to make them available; this is the opposite of what I think the law should aim to do (I6).

Indigenous representatives are attempting to use the ABS debate to articulate their own claims for the demarcation and strengthening of their territorial rights. Land and territorial rights, though, are not addressed by the Nagoya Protocol or the Biodiversity Act (representative of the church organization I9).

Individual observers such as the activist and lawyer we interviewed (I7) also fear that the biocultural protocols could have the opposite effect to that intended; indeed, the Lei da Biodiversidade includes biocultural protocols as a valid source of prior informed consent (Art. 2, VI). Instead of contributing to the re-embedding of knowledge, they may end up preparing the ground for further commodification by granting access to knowledge:

> So, they [the biocultural protocols] are available worldwide and easily accessible, right? This means there is also the question of easy access to this Traditional knowledge and the danger of unauthorized access to this knowledge. […] We support the biocultural protocol, but there are other questions we need to ask: To what extent might the registration and the provision of data and even funding by international companies be something that is not necessarily in line with what we believe here? (I7)

The quote illustrates a certain skepticism about the potential consequences of cataloguing knowledge through protocols, as it could pave the way for renewed commodification. Nevertheless, this interviewee – like most of the others – still supports this instrument of documentation. The ambivalence here is undeniable. On the one hand, the protocols give Indigenous knowledge a degree of visibility and recognition, thus limiting its potential appropriation by external parties. On the other hand, there are risks associated with publishing knowledge in this way (see also Ido 2016).

Finally, several interview excerpts (e.g. activist and lawyer I7, Indigenous representative I4, NGO worker I8) suggest that the idea of biocultural protocols is being taken to communities and that they are being encouraged to engage in this process:

> So, I think the process must be reversed in the case of the biocultural protocol. The community has to say: 'We already have our norms, our rules, and the state has to follow them, and not the other way around. We have already seen, for example, how the state says: 'Aha, we are going to create the protocol' and then it sends all its Ministry of Environment technicians to the middle of the Amazon (I4).

This quote confirms the observation made throughout the study that few Indigenous representatives are familiar with the mechanism or able to speak on the subject. Indigenous communities seemed almost absent from the process. This is also reflected in a statement by a lawyer we interviewed (I14), who notes that Indigenous people often do not participate in the CGEN body:

> Sometimes we find it difficult to engage in dialogue with Traditional peoples, with Indigenous peoples, precisely because of this discrepancy. Sometimes there is an ideological shadow, the shadow of political positions that get in the way of the debate and somehow obscure it. We cannot move forward (I14).

The biocultural protocols represent the most far-reaching attempt to date to re-embed traditional knowledge in the social and cultural contexts of local knowledge holders. Nonetheless, this mechanism is extremely complex and drawn out. Despite frequent references to these protocols and the hopes placed in them, few have been adopted to date. While they contribute to some recognition of Indigenous knowledge, they have not paved the way for monetary redistribution. Moreover, the protocols ensure that civil society actors invest considerable effort in their development, but in doing so these actors enter the terrain and logic of a process whose outcomes do not deviate from the logic of intellectual property rights (Fredriksson 2018). As a result, they no longer question the

basis of this “amputated” re-embedding. Transformative approaches that challenge or seek to overcome the premise of private intellectual property no longer play a role.

6. Conclusion: recognition without redistribution in times of structural change of property and the re-embedding through the Nagoya Protocol

Our study confirms that the Nagoya Protocol contributes to the global recognition of the knowledge of IPLCs in plants, animals, medicines, and seeds. There is an international consensus on the need to prevent biopiracy. This ABS mechanism, however, does not provide for reparations for 500 years of destruction and dispossession. Furthermore, the attempt to re-embed intellectual property by giving IPLCs a share of the profits from products and patents is ultimately contradictory: while it signals recognition of indigenous knowledge, it fails to deliver meaningful economic redistribution. We interpret the results so far as ‘amputated re-embedding’ because we see some achievements, many ambivalences and several limits of the process of regulation of intellectual property rights in the Nagoya process. Nagoya has failed in terms of its own goal of a regulation on access and benefit sharing – this central goal of a reformist re-embedding has not been achieved. Nevertheless, Nagoya has led to changes, particularly at the level of recognition.

The main achievement is that some Indigenous representatives feel recognized and involved in the implementation of Nagoya. The importance of IPLC knowledge is acknowledged in the process; their intellectual contribution to specific products, from medicines to biopesticides, is now being seen. In Brazil, the Nagoya Protocol is also having an impact at the margins and outside its jurisdiction. In the spirit of Nagoya, sustainable cosmetics companies, for example, are seeking to obtain fair purchase prices from communities of collectors. They are considered best practice in ABS. Many of the civil society actors interviewed have high hopes that Nagoya will improve the general situation of IPLCs in the future and evaluate the Nagoya process more positively than the literature does.

Nevertheless, we see a number of ambivalences towards the Nagoya regulations. The whole process is complicated and requires so much legal and technical expertise that it excludes many civil society actors and IPLCs. There is no significant output in terms of monetary redistribution, which has several problematic effects: It hinders the investigation of Brazilian researchers on biodiversity issues, while large companies tend to circumvent the Nagoya regime by basing their work on the DSI. In the absence of material redistribution, we speak of an amputated re-embedding, which implies opportunities on a symbolic level, but not yet on a material one.

Moreover, there are clear limits to the whole process: it has left aside several issues with a potentially transformative character, such as restitution for the dispossession and biopiracy of the last 500 years. It is still unclear how communities will be consulted and whether they can refuse the propertization of their knowledge and products, and if they do, how their will is to be enforced. In addition, the Nagoya process failed to guarantee collective land rights. This last point is a key demand of Indigenous actors in Brazil and beyond.

Table 2 situates our findings within a continuum of possible (future) forms of property re-embedding. The extent to which our typology of re-embedding can be applied to other cases also requires further investigation.

Table 2: An empirically grounded conceptualization of re-embedding

	Amputated re-embedding	Reformist re-embedding	Potential elements of a transformative re-embedding
General idea	Social forces struggling for the re-embedding of property without achieving effective regulations	Social forces struggling for the re-embedding of property archiving to limit further propertyzation and redistribute benefits	Beyond private property: effective limits to propertization, restitution for past propertization, and the re-embedding of economy (and property) into society.
Historical situation	Current situation	Option for the future: stakeholders hope for full compliance with promises made to IPLCs in the Nagoya process	Option for the future: Restitution for biopiracy and land dispossession in the past (only achievable by a significant shift of social forces)
Recognition	Recognition of the knowledge's origin, but Indigeneity used as a selling point**;** decisions on how the knowledge is used are not in the hands of IPLCs	Recognition of IPLCs importance for specific products and for biodiversity presservation	Indigenous knowledge documented by IPLCs themselves and decisions on how the knowledge is used (and not) in their own hands
Redistribution	Promised monetary benefits, but de facto they do not reach IPLCs	Significant monetary and non-monetary benefits for IPLCs	Significant monetary and non-monetary benefits, guaranteeing the fulfilment of basic needs and survival as a collective
Prior informed consent	Formally established, but easy to circumvent; unclear what happens in the case of negative responses	Obligatory informed consent as precondition for commodification with established option to say no	Obligatory informed consent as precondition for commodification with established option to say no. Fully digital sovereignty.

(Further) commodification	Possible if Nagoya protocol procedure is formally fulfilled; or by using DSI	Decision on commodification in hands of IPLCs; fully established right to say no	Decision on commodification in hands of IPLCs; fully established right to say no (no means no)
Conditions of existence for IPLCs	Formal recognition of importance of IPLCs for biodiversity recognition, but no effective protection of their territorial and cultural rights	Guaranteed land and cultural rights; protection against dispossession	Guaranteed land rights; protection against dispossession, reclaiming previously dispossessed lands, effective measures against structural exclusion of IPLCs

Source: authors' elaboration, based on Polanyi and Fraser and our empirical outcomes

But what are the implications of our findings for the SFB's overarching question of the structural change of property? We have conducted a qualitative study focusing on Brazil in a very specific area – the ABS mechanism of the Nagoya Protocol. Looking at the regulation of the specific area of genetic resources from this experience, we can identify two moments in which developments occur that may indicate a structural change of/in property:

First, in the 1980s and 1990s, genetic resources were conceptualized as such, and a new object of property was created. International patent law enabled (trans)national corporations to patent seeds, medicinal plants and properties of organisms that had been cultivated – sometimes over thousands of years - by IPLCs or smallholders. An international campaign against biopiracy developed in response to these appropriation practices, and a certain re-embedding of property was discussed at the international level. Thus, formally, biodiversity was no longer conceptualized as the "common heritage of mankind," but as an issue to be regulated in the nation-states where this biodiversity first appears, taking into account the contribution and rights of the IPLC. In our view, the Nagoya Protocol was an incomplete attempt to curb this commodification by introducing the concept of access and benefit sharing (ABS). On a formal level, the ratification of the Nagoya Protocol can be interpreted as an attempt to initiate a structural change of/in property, but with ambivalent effects. Since then, considerable efforts have been made to implement the ABS mechanism established in the Nagoya Protocol and the Brazilian Biodiversity Law. Yet, the implementation process has proved difficult, ambivalent, and controversial (see above), partly due to conflicting interests. Both the Nagoya Protocol and the Brazilian Biodiversity Law can be seen as compromises between different interest groups.

The second dimension in which developments are taking place that can be linked to a structural change of property in the field of genetic resources is digitalization. In the future, AI is likely to become increasingly important here as well (Halewood et al. 2023).

These technological developments, in our interpretation, undermine the already inadequate process of re-embedding, as both objects and subjects of property become increasingly blurred. The agreement of the Conference of the Parties in Cali in 2024 only partially addresses and regulates digital access – for large companies and only on a voluntary basis. From the perspective of the sociology of property, there is a great need for research in this area. Many of our interviewees in Brazil expressed concern about digitalization but are primarily working to adapt the existing legal framework.

The changes that are taking place in intellectual property are not encouraging developments beyond property. There is no debate about alternative forms of property beyond the redefinition of intellectual property rights. Nevertheless, our empirical data confirm the state of research in Brazilian legal anthropology (e.g., in Brightman et al. 2016; Ido and Valentini 2016) that many researchers and activists see property rights as a means to secure collective Indigenous rights. Some lawyers, Indigenous peoples, and activists hope that the Biodiversity Law will contribute to greater justice and have therefore decided to continue to shape its implementation process (Porro 2017: 24; Relly 2024). To date, the Biocultural Protocols have been the most far-reaching attempt to re-embed traditional knowledge in the social and cultural contexts of local knowledge holders. Civil society and Indigenous representatives have high hopes for them. However, despite extensive discussion, surprisingly few protocols have been developed, and those that do exist are relatively general and lack meaningful detail on genetic resources. The IPLCs have not yet benefited from them in any meaningful way, as no payments have been made. The existing ABS regulations, often presented as best practice, are not enshrined in the Nagoya Protocol or the Brazilian Biodiversity Law. Instead, they merely provide fair payment for the biomaterials collected. Despite these challenges, many of our interviewees emphasized that biocultural protocols provide a degree of recognition for IPLCs.

In the words of Nancy Fraser, this situation represents recognition without redistribution in the broader sense (Fraser and Honneth 2003). Although promises of redistribution have been made, they have not yet been fulfilled (see Table 2). Nevertheless, the Biodiversity Act, the ABS mechanism and the biocultural protocols enjoy a high degree of legitimacy in Brazilian civil society and among the experts involved. The effects are mixed, at least from a sociological point of view: it is true that the protocols contribute to the recontextualization and re-embedding of genetic resources and the associated traditional knowledge, which had previously been appropriated by transnational corporations without consent. This does not undo the appropriation that has already occurred; instead, it legitimizes it. The processes of commodification that took place before the ratification of the Nagoya Protocol are neither addressed nor compensated. While the

countermovement (against biopiracy) has contributed to a certain re-embedding, it has not eliminated the market mechanism and its unequal distribution effects. The regulation and "amputated" re-embedding of (private) property does not weaken this mechanism, but rather helps to legitimize it despite its shortcomings when it comes to genetic resources. At the same time, the stage is set for discussion. Transformative alternatives that challenge the system of private property itself and transcend the logic of the capitalist market remain marginal to the debate. The regulatory challenge posed by DSI further limits the scope for re-embedding. In response, civil society actors and indigenous advocates seek to secure niches in which collective property is possible through the introduction and respect of biocultural protocols, rather than seeking to transform property relations. We are also critical of the fact that the central issue driving counter-movements, namely the protection of collective land and territorial rights, is increasingly disappearing from the discussion. These rights are currently under pressure throughout Brazil due to new processes of commodification driven by mining, road building and agribusiness (see Backhouse 2022).

Cited interviews

I1	Interview 1	Biology professor and environmental activist	14 December 2021	Brazil
I2	Interview 2	Scientists	10 January 2023	Brazil
I3	Interview 3	Indigenous representative at CGEN	14 December 2022	Canada
I4	Interview 4	Biologist, head of an association of Traditional communities and CGEN member	18 December 2022	Canada
I5	Interview 5	Employee of a cosmetics company	3 March 2023	Brazil
I6	Interview 6	Lawyer, defender of Indigenous rights	26 January 2023	Brazil
I7	Interview 7	Lawyer-activist	15 March 2022	Brazil
I8	Interview 8	Brazilian office of a US-American NGO	2 March 2023	Brazil
I9	Interview 9	Employee of a church organization that campaigns for Indigenous rights	17 March 2022	Brazil
I10	Interview 10	Biologist, sustainability expert	13 January 2023	Brazil
I11	Interview 11	Biologist	11 January 2023	Brazil
I12	Interview 12	Former representative of the Ministry of the Environment	25 January 2023	Brazil
I13	Interview 13	Indigenous representative	28 January 2023	Online
I14	Interview 14	Industrial policy expert and lawyer	9 December 2021	Online
I15	Interview 15	Activist	26 January 2023	Brazil

Literature

Almeida, Alfredo Wagner Berno de (2010). *Conhecimento tradicional e biodiversidade. Normas vigentes e propostas.* Manaus.

Altvater, Elmar and Birgit Mahnkopf (1996). *Grenzen der Globalisierung. Ökonomie, Ökologie und Politik in der Weltgesellschaft*. Münster.

Andrade, Jaqueline P. (2022). *A proteção da biodiversidade pelos saberes comunitários: um estudo dos protocolos bioculturais na América Latina*. Master thesis, Universidade Federal do Paraná. Curitiba, PR.

Angelis, Massimo de (2001). "Marx and Primitive Accumulation: The Continuous Character of Capital's 'Enclosures'." *The Commoner* 2: 1–22.

Articulação Pacari (2015). *Protocolo comunitário biocultural das raizeiras do Cerrado. Direito consuetudinário de praticar a medicina tradicional*.

Association of Civil Society Organizations in Brazil (2022). *Carta Aberta de Recomendações e Posicionamento Da Sociedade Civil Brasileira para a 15ª Conferência das Partes da Convenção sobre Diversidade Biológica e seus Protocolos (Cop 15)*. Brasilia. https://terradedireitos.org.br/uploads/arquivos/Carta-web-COP15-Portugues.pdf, last seen on July 1, 2025.

Basta, Paulo, Islandia Souza, Aparecida Benites, and Ananda Bevacqua, eds. (2020). "Pohã Ñana; nãnombarete, tekoha, guarani ha kaiowá arandu rehegua = Plantas medicinais: fortalecimento, território e memória guarani e kaiowá. Recife." Online: https://acervo.socioambiental.org/acervo/livros/poha-nana-nanombarete-tekoha-guarani-ha-kaiowa-arandu-rehegua-plantas-medicinais.

Backhouse, Maria (2022). „Die Aktualität der Frontier als Analysekonzept: Eine Einordnung der aktuellen Landkonflikte in Amazonien." *Peripherie* 167–68: 346–69. https://doi.org/10.3224/peripherie.v42i2.06.

Bennholdt-Thomsen, Veronika, Maria Mies, and Claudia von Werlhof (1992). *Frauen, die letzte Kolonie. Zur Hausfrauisierung der Arbeit*. Zürich.

Bompan, Emanuelle (2024). "COP16, DSI mechanism for benefit sharing from the use of digital sequence information approved." Online: https://www.renewablematter.eu/en/COP16-DSI-mechanism-for-benefit-sharing-from-the-use-of-digital-sequence-information-approved, last seen on September 17, 2025.

Brand, Ulrich and Christoph Görg (2003). *Postfordistische Naturverhältnisse. Konflikte um genetische Ressourcen und die Internationalisierung des Staates*. Münster.

Braun, Veit (2024). *At the End of Property. Patents, Plants and the Crisis of Propertization*. Bristol.

Brightman, Marc, Carlos Fausto, and Vanessa Elisa Grotti (2016). "Altering Ownership in Amazonia." *Ownership and Nurture. Studies in Native Amazonian Property Relations*. Edited by Marc Brightman, Carlos Fausto, and Vanessa Elisa Grotti, 1–35. New York, Oxford.

Bockmann, Flávio A., Miguel T. Rodrigues, Tiana Kohsldorf, Lorian C. Straker, Taran Grant, Mário C. de Pinna, Fernando L. Mantelatto, Aléssio Datovo, José P. Pombal, John C. McNamara, Eduardo A. de Almeida, Wilfried Klein, Annie S. Hsiou, Milton Groppo, Ricardo M. E Castro, and Dalton de Souza Amorim (2018): "Brazil's Government Attacks biodiversity." *Science* 360 (6391): 865. https://doi.org/10.1126/science.aat7540.

Bond, Molly R. and Deborah Scott (2020). "Digital Biopiracy and the (Dis)assembling of the Nagoya Protocol." *Geoforum* 17: 24–32.

Carroll, Stephanie Russo, Edit Herczog, Maui Hudson, Keith Russell, and Shelley Stall (2021). "Operationalizing the CARE and FAIR Principles for Indigenous Data Futures." *Scientific Data* 8 (1): 108. https://doi.org/10.1038/s41597-021-00892-0.

Chandra, Rajshree (2016). *The Cunning of Rights. Law, Life, Biocultures*. New Delhi.

Cohen, Julie (2017). "Property and the Construction of the Information Economy: A Neo-Polanyian Ontology." *Handbook of Digital Media and Communication*. Edited by Leah Lievrouw and Brian Loader. Abingdon/New York.

Da Cunha, Manuela C., Mauro B. de Almeida, Adão J. Cardoso, Agostinho Muru, and Alexandre G. Andrade (2002). *Enciclopédia da floresta. O Alto Juruá: práticas e conhecimentos das populações*. São Paulo.

Dallagnol, André, Marciano Silva, and Winnie Overbeek (2016). *Lei da Biodiversidade Brasileira: Um Avanço ou uma Ameaça?* Online: https://wrm.org.uy/pt/artigos-do-boletim-do-wrm/secao1/lei-da-biodiversidade-brasileira-um-avanco-ou-uma-ameaco/, last seen on November 15, 2024.

Da Silva, Manuela, Ferreira de Souza Dias, Marinello Braulio, and Luiz Ricardo (2021). "Comentários e recomendações para regulamentar o Protocolo de Nagoia no Brasil." *Revista do ABPI* 171: 28–49. Online: https://fiocruz.br/sites/fiocruz.br/files/documentos/revista_abpi_-_171_-

_recomendacoes.regulamentar_protocolo_de_nagoia_1.pdf, last seen on September 17, 2025.

Delgado-Ramos, Gian Carlo (2002). „Biopiraterie und geistiges Eigentum als Eckpfeiler technologischer Herrschaft." *Wem gehört die Natur? Konflikte um genetische Ressourcen in Lateinamerika.* Edited by Ulrich Brand and Monika Kalcsics, 95–111. Frankfurt/M.

Dutfield, Graham (2004). *Intellectual Property, Biogenetic Resources and Traditional Knowledge*. Abingdon/New York.

Dutfield, Graham (2015). "Traditional Knowledge, Intellectual Property and Pharmaceutical Innovation: What's Left to Discuss?" *The Sage Handbook of Intellectual Property*. Edited by Matthew David and Debora Halbert, 649–64. Los Angeles, CA/London/New Delhi.

Dutfield, Graham (2020). *That High Design of Purest Gold: A Critical History of the Pharmaceutical Industry from 1880 to 2020*. Hackensack N.J.

Frank, André G. (1998). *ReORIENT. Global Economy in the Asian Age*. Berkeley, CA/Los Angeles/London.

Fraser, Nancy (2011). "Marketization, Social Protection, Emancipation: Toward a Neo-Polanyian Conception of Capitalist Crisis." *Business as Usual. The Roots of the Global Financial Meltdown*. Edited by Craig Calhoun and Georgi Derluguian, 137–58. New York.

Fraser, Nancy (2013). "A Triple Movement?" *New Left Review* 2 (81): 119–32.

Fraser, Nancy and Axel Honneth (2003). *Redistribution or Recognition? A Political-philosophical Exchange*. London/New York.

Fredriksson, Martin (2018). "From Biopiracy to Bioprospecting. Negotiating the Limits of Propertization." *Property, Place and Piracy*. Edited by James Arvanitalis and Martin Frederiksson, 174–86. London/ New York.

Golan, Jacob, KatieLee Riddle, Maui Hudson, Jane Anderson, Natalie Kusabs, and Tim Coltman (2022). "Benefit Sharing: Why Inclusive Provenance Metadata Matter." *Frontiers in Genetics* 13: 1014044. https://doi.org./10.3389/fgene.2022.1014044.

Goodwin, Geoff (2018). "Rethinking the Double Movement: Expanding the Frontiers of Polanyian Analysis in the Global South." *Development and Change* 49 (5): 1268–90. https://doi.org/10.1111/dech.12419.

Görg, Christoph (2004). „Stichwort Inwertsetzung." *Historisch Kritisches Wörterbuch des Marxismus*, Imperium bis Justiz, 1502–6.

GSS Sustentabilidade e Bioinovação Ltda, Croda International Plc, and Natura & Co (2022). *Brogotá Project. ABS around the World: The Brazilian Law Contrasted with International Legislations*. São Paulo. Online: https://enb.iisd.org/abs-around-world-brazilian-law-contrasted-international-legislations.

Guetta, Mauricio and Nurit Bensusan (2018). "Tutela dos conhecimentos tradicionais face à sua diversidade. A emergência dos protocolos comunitários." *Propriedades em transformação. Abordagens multidisciplinares*. Edited by Debora Ungaretti, Marilia R. Lessa, Diogo R. Coutinho, Flávio M. Prol, Iagê Z. Miola, and Tomaso Ferrando, 117–40. São Paulo.

Halewood, Michael, Margo A. Bagley, Markus Wyss, and Amber Hartman Scholz (2023). "New Benefit-sharing Principles for Digital Sequence Information." *Science* 382 (6670): 520–22. https://doi.org/10.1126/science.adj1331.

Hayden, Cori (2003). *When Nature Goes Public. The Making and Unmaking of Bioprospecting in Mexico*. Princeton.

Hein, Wolfgang, Reinhart Kößler, and Michael Korbmacher (2006). „Historisch-kritische Überlegungen zum Eigentum. Statt eines Editorials." *Peripherie. Zeitschrift für Politik und Ökonomie in der Dritten Welt* 101–2: 3–17.

Hume, David (1978 [1739]). *A Treatise of Human Nature*. Oxford.

Ido, Vitor H., ed. (2016). *Amazonian Traditional Knowledge. A Commons Approach versus Intellectual Property Rights*. Online: https://www.academia.edu/36327595/Amazonian_Traditional_Knowledge_A_Commons_Approach_versus_Intellectual_Property_Rights, last seen on November 14, 2024.

Ido, Vitor H. (2018). "Direitos intelectuais indígenas no Brasil. Instrumentos jurídicos e conflitos ontológicos." *Revista de Estudos Empíricos em Direito* 5 (3): 176–86.

Ido, Vitor H., Henrique Pinto, and Luísa Valentini (2018): "Quem tem a propriedade da transformação? Propriedade intelectual e figurações equívocas da circulação dos conhecimentos indígenas." *Propriedades em transformação. Abordagens multidisciplinares*. Edited by Debora Ungaretti, Marilia Rolemberg Lessa, Diogo R. Coutinho, Flávio Marques Prol, Iage Zendron Miola, Tomaso Ferrando, 97–116. São Paulo.

Just, Daniela, Nicole Kornherr, Romana Litzka, and Lars Oppermann (2010). "Odyssee des internatinalen ABS-Regimes. Eine Analyse struktureller Probleme und asymmetrischer Kräfteverhältnisse." *Globale Umweltpolitik und Internationalisierung*

des Staates. Biodiversitätspolitik aus strategisch-relationaler Perspektive. Edited by Ulrich Brand, 27–73. Münster.

Kaiser, Gregor (2012). *Eigentum und Allmende: Alternatives zu exklusiven geistigen Eigentumsrechten an genetischen Ressourcen*. München.

Karayanidi, Milana (2011). "Bargaining Power in Multilateral Negotiations on Intellectual Property Rules: Paradox of Weakness." *The Journal of World Intellectual Property* 14 (3–4): 265–75. https://doi.org/10.1111/j.1747-1796.2011.00418.x.

Kopenawa, Davi, Bruce Albert, and Alison Dundy (2013). *The Falling Sky. Words of a Yanomami Shaman*. Cambridge, MA.

Kloppenburg, Jack R., jr. (2004). *First the Seed. The Political Economy of Plant Biotechnology, 1492–2000*. Madison, Wisconsin.

Klünker, Irma (2024). *Die Tragödie des Access and Benefit-Sharings: Nutzungsregeln für genetische Ressourcen und digitale Sequenzinformation*. Trier. Online: https://digitalrecht-z.uni-trier.de/index.php/drz/catalog/view/37/36/160, last seen on November 15, 2024.

Laird, Sarah, Rachel Wynberg, Michelle Rourke, Fran Humphries, Manuel Ruiz Muller, and Charles Lawson (2020). "Rethink the Expansion of Access and Benefit Sharing." *Science* 367 (6483): 1200–2. https://doi.org/10.1126/science.aba9609.

Liaudat, Santiago (2021). *Stevia. Conocimiento, propiedad intelectual y acumulación de capital*. Buenos Aires.

Marinello, Luiz R. (2024). "Resultados envolvendo a repartição de benefícios pelo uso de DSI (COP16/Cali)." *Revista Migalhas* (online). Online: https://www.migalhas.com.br/depeso/419438/resultado-envolvendo-reparticao-de-beneficio-por-uso-dsi-cop16-cali, last seen on November 15, 2024.

Mayring, Philipp and Thomas Fenzl (2019). "Qualitative Inhaltsanalyse." *Handbuch Methoden der empirischen Sozialforschung*. Edited by Nina Baur and Jörg Blasius, 633–48. Wiesbaden.

Marx, Karl (1973 [1867]). *Das Kapital. Kritik der politischen Ökonomie,* First Volume, MEW 23. Berlin (GDR).

McAfee, Kathleen (1999). "Selling Nature to save It? Biodiversity and Green Developmentalism." *Environ Plan D* 17 (2): 133–54. https://doi.org/10.1068/d170133.

Meyer, Camille and Kiruben Naicker (2023). "Collective Intellectual Property of Indigenous Peoples and Local Communities: Exploring Power Asymmetries in the

Rooibos Geographical Indication and Industry-wide Benefit-sharing Agreement." *Research Policy* 52 (9): 104851. https://doi.org/10.1016/j.respol.2023.104851.

Melo, Paulo Tarso Anunciação de and Maria das Graças Ferraz Bezerra (2023). "Desenvolvimento de Marca Coletiva para Comunidade de Mulheres Extrativista de Óleo de Andiroba da Ilha do Combú – Belém – Pará." *CP* 16 (1): 128–43. https://doi.org/10.9771/cp.v16i1.49031.

Meuser, Michael and Ulrike Nagel (2016): "Experteninterview." *Handbuch Professionsentwicklung*. Edited by Michael Dick, Winfried Marotzki, and Harald A. Mieg, 342–52. Bad Heilbrunn.

Moreira, Eliane, Noemi M. Porro, and Lianan A. Da Silva, eds. (2017). *A "nova" lei n. 13.123/2015 no velho marco legal da Biodiversidade. Entre Retrocessos e Violações de Direitos Socioambientais*. São Paulo.

Mooney, Pat R. (1983). *Seeds of the Earth: A Private or Public Resource?* Ottawa.

Mooney, Pat R. (2000). "Why We Call It Biopiracy." *Bioprospecting: From Biodiversity in the South to Medicines in the North*. Edited by H. Svarstad and S. S. Dhillion, 37–44. Oslo.

Moore, Jason W. (2003). "The *Modern World-Systemas* as Environmental History? Ecology and the Rise of Capitalism." *Theory and Society* 32 (3): 307–77. https://doi.org/10.1023/A:1024404620759.

Moura, Mario R. and Walter Jetz (2021). "Shortfalls and Opportunities in Terrestrial Vertebrate Species Discovery." *Nature Ecology & Evolution* 5 (5): 631–39. https://doi.org/10.1038/s41559-021-01411-5.

Mulatinho Simoes, Raisa and Vicki L. Birchfield (2024). "Biodiversity and the Digital Transformation. Rethinking Private Property and Global Governance in the Twenty-first Century." *Environmental Ethics* 46 (1): 47–69. https://doi.org/10.5840/enviroethics202422270.

Muller, Manoel Ruiz (2018). *Access to Genetic Resources and Benefit Sharing 25 Years on: Progress and Challenges*. Geneva.

Nadja Lepsch-Cunha, Maria B. Bonacelli, Leandro Innocentini Lopes de Faria, and Henrique E. M. Nascimento, eds. (2018). *Importância dos recursos genéticos na indústria de medicamentos e os atores envolvidos no acesso a plantas da Amazônia: A legislação é factível ao uso da biodiversidade e à repartição de benefícios? I Congresso de Gestao da Amazonia*. Manaus.

Peters, Florian, Jonathan Rinne, Robin K Saalfeld., Stefan Schmalz, Amelie Stuart, and Lydia von der Weth (2024). *Eigentumskonflikte. Eine Typologie*. Online:

https://sfb294-eigentum.de/media/filer_public/f9/08/f908691c-7aaa-424c-831b-71e7818ee46b/wp_05_fin.pdf, last seen on November 15, 2024.

Polanyi, Karl (1977). *The Great Transformation. Politische und ökonomische Ursprünge von Gesellschaften und Wirtschaftssystemen*. Wien.

Porro, Noemi M. (2017). "Apresentação." *A "nova" lei n. 13.123/2015 no velho marco legal da Biodiversidade. Entre Retrocessos e Violações de Direitos Socioambientais*. Edited by Eliane C. Moreira, Noemi M. Porro, and Lianan A. Da Silva, 23–26. São Paulo.

Posey, Darrell A. (1999). "Introduction: Culture and Nature – the Inextricable Link." *Cultural and spiritual values of biodiversity. A complementary contribution to the global biodiversity assessment*. Edited by Darrell A. Posey. London.

Povo Ashaninka (2016). *Protocolo de Serviços Ambientais dos Ashaninka da Terra Indígena Kampa do Rio Amonea*. Online: https://www.forest-trends.org/wp-content/uploads/imported/ashaninka-protocolo-de-servios-ambientais-livrocompletoweb-pdf.pdf, last seen on November 15, 2024.

Proudhon, Pierre-Joseph (2018 [1840]). *Was ist das Eigentum?* Münster.

Rabitz, Florian (2015). "Biopiracy after the Nagoya Protocol. Problem Structure, Regime Design and Implementation Challenges." *Brazilian Political Science Review* 9 (2): 30–53. https://doi.org/10.1590/1981-38212014000200010.

Rasmussen, Nicolas (2014). *Gene Jockeys. Life Science and the Rise of Biotech Enterprise*. Baltimore.

RAFI and HSCA (1998). *An Inquiry into the Potential for Plant Piracy through International Intellectual Property Conventions. Plant Breeders Wrongs*. Online: https://www.etcgroup.org/sites/www.etcgroup.org/files/publication/400/01/occ_plant.pdf, last seen on November 15, 2024.

Rede GTA and Comite gestor do protocolo comunitário do Bailique (2013). *Protocolo Comunitário do Bailique. Conhecer para proteger*. Online: http://observatorio.direitosocioambiental.org/wp-content/uploads/2020/10/Protocolo-Comunitario-do-Bailique.pdf, last seen on November 15, 2024.

Reitz, Tilman, Sebastian Sevignani, and Marlen van den Ecker (2023). „Eigentum im digitalen Kapitalismus. Ökonomie, Recht und Praxis." *Theorien des digitalen Kapitalismus*. Edited by Tanja Carstensen, Simon Schaupp and Sebastian Sevignani, 264–84. Frankfurt/M.

Reitz, Tilman (2024). „Das Gemeinsame, das Ausschließliche und das Unrentable. Funktionsprobleme des postindustriellen Kapitalismus." *Nach dem Privateigentum? Güter, Infrastrukturen und Weltverhältnisse im Kapitalismus des 21. Jahrhunderts*. Edited by Silke van Dyk, Tilman Reitz, Hartmut Rosa, 49–130. Frankfurt/M./New York.

Relly, Eduardo (2023). "Recursos genéticos e bioprospecção no Brasil: capitaloceno, protagonismo e os (des)caminhos até o Protocolo de Nagoya (2010)." *Caravelle* 119: 89–106. https://doi.org/10.4000/caravelle.13152.

Relly, Eduardo (2024). "Brazil's Implementation of Access and Benefit-sharing and the Nagoya Protocol: Analyzing Some Trends and Positions in the Ongoing Debate." *GenResJ* 5 (10): 65–80. https://doi.org/10.46265/genresj.GKTE3850.

Relly, Eduardo, Leoni Schlender, and Anne Tittor (2024). "Quo vadis Nagoya Protocol? Access-and-benefit Sharing of Genetic Resources of Biodiversity in Times of Digitalization." *sfb294-eigentum.de*, February 20, https://sfb294-eigentum.de/de/blog/quo-vadis-nagoya-protocol-access-and-benefit-sharing-of-genetic-resources-of-biodiversity-in-times-of-digitalization/.

Reserva Extrativista (Resex) do Riozinho do Anfrísio (2013). *Protocolo Bioultural Comunitário da Reserva Extrativista (Resex) do Riozinho do Anfrísio*. Online: https://observatorio.direitosocioambiental.org/wp-content/uploads/2020/12/Protocolo-Biocultural-Riozinho.pdf, last seen on October 15, 2024

Robinson, Daniel F. (2010). *Confronting Biopiracy. Challenges, Cases and International Debates*. London/Washington, DC.

Robinson, Daniel F. and Miranda Forsyth (2016). "People, Plants, Place, and Rules: The Nagoya Protocol in Pacific Island Countries." *Geographical Research* 54 (3): 324–35.

Rosa, Hartmut (2023). "Property as the Modern Form of Weltbeziehung: Reflections on the Structural Change of Possessive Forms of Relating to the World." *"Weltbeziehung" The Study of our Relationship to the World*. Edited by Bettina Hollstein, Hartmut Rosa and Jörg Rüpke, 19–35. Frankfurt/New York.

Rousseau, Jean-Jacques (1968 [1762]). *The Social Contract*. Harmondsworth.

Scholz, Amber, Upneet Hillebrand, Jens Freitag, Ibon Cancio, Carolina dos S. Ribeiro, George Haringhuizen, Paul Oldham, Devanshi Saxena, Claudia Seitz, Torsten Thiele, and Esther van Zimmeren (2020): *Finding Compromise on ABS & DSI in the CBD: Requirements & Policy Ideas from a Scientific Perspective*.

Scholz, Amber H., Jens Freitag, Christopher H. Lyal, Rodrigo Sara, Martha L. Cepeda, Ibon Cancio, Scarlett Sett, Andrew L. Hufton, Yemisrach Abebaw, Kailash Bansal, Halima Benbouza, Hamadi I. Boga, Sylvain Brisse, Michael W. Bruford, Hayley Clissold, Guy Cochrane, Jonathan A. Coddington, Anne-Caroline Deletoille, Felipe García-Cardona, Michelle Hamer, Raquel Hurtado-Ortiz, Douglas W. Miano, David Nicholson, Guilherme Oliveira, Carlos O. Bravo, Fabian Rohden, Ole Seberg, Gernot Segelbacher, Yogesh Shouche, Alejandra Sierra, Ilene Karsch-Mizrachi, Jessica Da Silva, Desiree M. Hautea, Manuela Da Silva, Mutsuaki Suzuki, Kassahun Tesfaye, Christian K. Tiambo, Krystal A. Tolley, Rajeev Varshney, María M. Zambrano, and Jörg Overmann (2022). "Multilateral Benefit-sharing From Digital Sequence Information Will Support both Science and Biodiversity Conservation." *Nature Communications* 13 (1): 1086. https://doi.org/10.1038/s41467-022-28594-0.

Shiva, Vandana (2004). *Biopiracy. The Plunder of Nature and Knowledge*. Boston, MA.

Siegrist, Hannes (2006). "Die Propertisierung von Gesellschaft und Kultur. Konstruktion und Institutionalisierung des Eigentums in der Moderne." *Comparativ* 16 (5/6): 9–52.

Siegrist, Hannes (2017). "1. Intellectual Property Rights and the Dynamics of Propertization, Nationalization, and Globalization in Modern Cultures and Economies." *Expanding Intellectual Property: Copyrights and Patents in 20th Century Europe and beyond*. Edited by H. Siegrist and A. Dimou, 17–48. Budapest, Hungary. https://doi.org/10.1515/9789633861868-003.

Suiseeya, Kimberly R. (2014). "Negotiating the Nagoya Protocol: Indigenous Demands for Justice." *Global Environmental Politics* 14 (3): 102–24. https://doi.org/10.1162/GLEP_a_00241.

Taylor, Luke (2024). "'A Big, Big Win': Plan to Pay for Wildlife Conservation Emerges at Biodiversity Summit." *Nature*. https://doi.org/10.1038/d41586-024-03609-6.

Teixeira, Patricia C. and Lívia M. Da Silva (2021). "Repartição de benefícios à luz da Lei nº 13.123/2015: casos de empresas com acesso ao patrimônio genético e ao conhecimento e ao conhecimento tradicional associado." *Revista Fitos* 15 (2): 204–16.

Tordjman, Hélène and Valérie Boisvert (2012): "L'idéologie marchande au service de la biodiversité ?" *Mouvements* 70 (2): 31–42. https://doi.org/10.3917/mouv.070.0031.

United Nations Working Group on Indigenous Populations (1982). *Report of the Working Group on Indigenous Populations on its 1st session*. Genf. Online: https://digitallibrary.un.org/record/36801?v=pdf, last seen on November 7, 2024.

van Dyk, Silke and Markus Kip (2023). "Rethinking Social Rights as Social Property: Alternatives to Private Property, and the Democratisation of Public Politics." *Critical Sociology* 50 (3): 437-452. https://doi.org/10.1177/08969205231195378.

van Vooren, Bart and Yuliya Gevrenova (2024). "The Impact of Co-Existing ABS Obligations ('Hybrid System') on Life Sciences Companiess: A View from Private Legal Practice." *Covington & Burling LLP*. Online: https://s3.amazonaws.com/cbddocumentspublic-imagebucket-15w2zyxk3prl8/d217304b492b0dff2bd521f5020ea573, last seen on November 11, 2024.

Vogel, Joseph H., Klaus Angerer, Manuel R. Müller, and Omar Oduardo-Sierra (2018). „Bounded Openness as the Modality for the Global Multilateral Benefit-sharing Mechanism of the Nagoya Protocol." *Routledge Handbook of Biodiversity and the Law*. Edited by Charles R. McManis and Burton Ong, 377–94. Abingdon/New York.

Wallerstein, Immanuel (1979). *The Capitalist World-economy. Essays*. Cambridge.

Wynberg, Rachel, Regine Andersen, Sarah Laird, Kudzai Kusena, Christian Prip, and Ola T. Westengen (2021). "Farmers' Rights and Digital Sequence Information: Crisis or Opportunity to Reclaim Stewardship Over Agrobiodiversity?" *Frontiers in Plant Science* 12: 686–728. https://doi.org/10.3389/fpls.2021.686728.

Zello, Fariborz (2024). *Making Peace with Nature? Reflections on the 2024 United Nations Biodiversity Conference in Cali, Colombia*. Online: https://natureofpeace.blogg.lu.se/making-peace-with-nature-reflections-on-the-2024-united-nations-biodiversity-conference-in-cali-colombia/, published on November 21, 2024, last seen on December 15, 2024.

Sonderforschungsbereich/Transregio 294

STRUKTURWANDEL DES EIGENTUMS

Indigenous peoples and local communities around the world have developed complex knowledge systems with nature that are valuable to many global industries. In 2010, the Nagoya Protocol was adopted as the central mechanism for access and benefit shar-ing (ABS). The ABS mechanism aims to ensure that so-called traditional (local) knowledge holders receive a share of the benefits generated by commercial appropria-tion. In this working paper, we draw on the work of Karl Polanyi and insights from the sociology of property to explore the potential of ABS for the social re-embedding and social regulation of intellectual property rights and traditional knowledge. Against this background, we examine the extent to which such re-embedding of this form of property has been successful and argue that we are currently witnessing an ”amputated” re-embedding of private intellectual property.

We illustrate our thesis with a qualitative study that examines the social negotiations surrounding the implementa-tion of the ABS mechanism in Brazil. We focus on the strategy propagated by many state, private, and civil society actors to catalogue the knowledge of Indigenous peoples and local communities (IPLCs) through so-called ”biocultural protocols,” with the aim of making this knowledge more visible and protecting it from biopiracy. In the last part of the paper, we reflect on whether we can currently identify a structural change of prop-erty in the area of genetic resources, and how digitalization in this area complicates the social re-embedding of property.

FRIEDRICH-SCHILLER-UNIVERSITÄT JENA

UNIVERSITÄT ERFURT

Gefördert durch

DFG Deutsche Forschungsgemeinschaft

SFB TRR 294/1–424638267